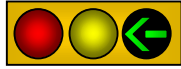


How do left turn signals work?

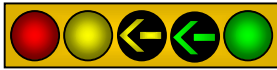
There are two types of left turn signal indications used in El Paso, protected only and permissive protected. A protected only left turn signal allows motorists to make left turns on a green arrow indication. During a protected only left turn, all opposing traffic is stopped and therefore motorists are protected from opposing traffic.

Protected Only



A permissive protected left turn signal allows motorists to make left turns on a green ball indication or a green arrow indication, but motorists are only protected during the green arrow indication. During the green ball indication, motorists are only allowed to make left turns after yielding to the opposing thru traffic.

Permissive/Protected



Opposing traffic is not stopped and therefore, motorists must wait for a gap in traffic to turn.

Why isn't there enough time to cross the street during the walk indication on a pedestrian signal?

The WALK indication on a pedestrian signal is only intended to let pedestrians know they can start crossing an intersection and is not usually intended to give enough time to cross the entire length of a street. The flashing DON'T WALK indication means you can continue to cross, but should not try to start crossing. Stated another way, the purpose of the flashing DON'T WALK indication is to keep pedestrians from entering an intersection too late and provide pedestrians already in an intersection with enough time to finish crossing. Although, just because a signal says it is safe to cross, pedestrians should never drop their guard. This is especially true when there are vehicles turning and possibly driving into the path of pedestrians crossing a street. There is no protection for anyone from careless drivers who don't know or obey the law.



City of El Paso

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**ENGINEERING
DEPARTMENT
TRAFFIC DIVISION**

Information Brochure



Traffic Signals



January 2005

City of
El Paso
Texas

Traffic Signals

This information brochure was prepared by the City of El Paso, Traffic Division to inform the public on some of the standards and procedures pertaining to traffic signals that will hopefully clarify any questions about traffic signals.

Traffic signals, when properly used, can be an invaluable tool for the control of vehicular and pedestrian traffic. They can provide better flow of traffic, increase capacity, create necessary gaps, and reduce certain types of accidents. Unfortunately, traffic signals are not a cure-all answer for all traffic related problems at intersections. In fact, when traffic signals are used incorrectly, conditions can actually worsen and become a safety hazard. This is why the City of El Paso looks at every intersection that is being considered for signalization very carefully and makes sure a signal is indeed needed.

How does El Paso determine where signals are installed?

An engineering study is first performed to determine whether an intersection qualifies to be signalized. This study uses minimum conditions called warrants, as defined in the Texas Manual on Uniform Traffic Control Devices (TMUTCD), to justify traffic signal installations. These warrants take into consideration vehicular volume, pedestrian volume, school crossings, signal coordination and accident information.

Once a traffic signal is approved, it may take anywhere from 1 year to 2 years to design, fund, and construct. On average, a signalized intersection costs about \$100,000.

How do traffic signals work?

There are basically two modes of operation for traffic signals, pre-timed and actuated. Both pre-timed signals and actuated signals are controlled by microprocessors called controllers. These controllers are the brains of a signalized intersection.

Pre-timed intersections provide a specified amount of time for every traffic movement whether there are vehicles at an intersection or not. Different cycles can be set throughout the day to accommodate for peak hour



Typical
Controller

traffic, but the cycle will always service every movement with a predetermined amount of time. These signals are usually found where traffic signals are closely spaced and the traffic flow patterns are evenly distributed with high pedestrian traffic, such as in downtown districts.

Actuated signalized intersections, on the other hand, are more common and widespread throughout the city. These signals are capable of varying the amount of time they give to a movement based on the traffic they service. This is the case because actuated intersections have sensors that detect the presence or passage of vehicles. This feature allows any unused green time to go to the movement that needs it. In theory, actuated signals are more efficient because the signals can adapt to different traffic patterns.

How does a traffic signal controller detect vehicles?

There are two types of sensors the city uses to detect vehicles, inductive loop detection and video detection. Inductive loop detectors, which are the most common, are wire loops that are embedded into a road's surface. These loops emit a magnetic field that can detect vehicles by the metal contained within a vehicle. These loops are placed behind the stop bar and only detect vehicles that travel directly above the loop. Therefore, it is important to stop behind the stop bar so detection can occur. It is also important to note that a second or third loop detector can also be installed several feet in advance of the first loop in order to measure the amount of traffic at an intersection and therefore, extend the amount of time needed to clear the vehicles from the intersection.



Loop Detectors

Video detection works in a similar fashion, except it uses video cameras to detect vehicles. These video cameras are usually installed on mast arms or on separate poles high above an intersection. Video detection is a fairly new technology that allows engineers more flexibility on how to operate a signalized intersection.



Video Detection

Sometimes these detection devices malfunction and therefore, the city needs to be notified as soon as possible. If you believe one of these devices is not working properly, please call the street department at 621-6750.

Are all cameras used for video detection?

No, some cameras are solely used for observation purposes and are usually only installed on major highways. These cameras, unlike video detection cameras, have the capability of being controlled by our technicians operating from the Traffic Management Center. They are used to help engineers see the current traffic conditions, observe traffic patterns, monitor changes and to assist during emergencies. The City of El Paso does not record or archive any images seen on these cameras.



Traffic Management
Center

How are signals timed?

Traffic engineers must first collect an extensive amount of data before developing settings for an intersection. Traffic counts, the number of lanes, the visibility, the speed limit, the proximity to other signals, and the grade are only a few examples of the type of information engineers look at before they can start timing an intersection. Once the data has been collected, signal optimization software is then used to analyze an intersection and to determine the best settings. Usually, three different timing scenarios are developed to address morning peak traffic, afternoon peak traffic and off-peak traffic patterns that occur throughout the day. A typical cycle can range from 75 seconds to 120 seconds.

What is signal coordination and is it used in El Paso?

Signal coordination helps provide uninterrupted flow of traffic through a series of consecutive signalized intersections. Signal coordination is typically used along heavily traveled arterial streets with closely spaced traffic signals. Therefore, with signal coordination, the heaviest traffic movements are given precedence over smaller traffic movements. This means that side street traffic will typically experience a longer wait time. However, once on the main street, motorists should experience better free flowing traffic conditions.

Here in El Paso we do use signal coordination where it is applicable. While traffic signal coordination can reduce stops and travel delays along a particular corridor, motorists may not completely experience non-stop free-flow conditions. The reason may be attributed to capacity issues, signal spacing, equipment malfunction, speeding motorists or just the complexity of the street system.